

**DETAILED ACTION**

***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(c), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(c) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on June 27, 2008 and July 17, 2008 have been entered.

***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 5, 6, 15, 19, 26, 30, 31, 35, 36, 39-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over RU 2092604C1 (RU'604) and "Aluminum Standards and data 2003" p 1-6.

RU'604 teaches an aluminum based alloy with 11-25% Si (substantially overlapping the Al-Si hypereutectic range), 1-4.5% Cu, 0.05-2% Ni, 0.1-2% Fe, 0.05-1% Mg, 0.1-2% Mn, 0.01-0.4% Ti, 0.005-0.5% V, 0.01-0.3% Zr (abstract), which overlaps the presently claimed alloying ranges. RU'604 teaches that said alloy has increased strength and elongation (abstract, examples) and can formed into products by casting. It is held to be within the scope of RU'604 to cast a

variety of products/ configurations, including a piston, because RU'604 teaches said alloy can be cast into high strength parts (abstract).

Concerning the instant ranges of P and Ca, "Aluminum Standards and data 2003" p 1-6 teaches Na, Sr, Ca, and/or P are added to 3xx and 4xx type Al-Si foundry alloys in order to modify the structure. "Aluminum Standards and data 2003" teaches 0.005-0.15% Ca and  $\leq 0.060\%$  P are effective modifiers. Though the minimum of 0.005%Ca taught by "Aluminum Standards and data 2003" does not fall within the presently claimed range of 0.0005-0.003% Ca, 0.005% is held to be a close approximation of 0.003%. It would have been obvious to one of ordinary skill in the art to use Ca and P as modifiers for the Al-Si alloy taught by RU'604, because "Aluminum Standards and data 2003" teaches Ca and P are effective modifiers for 3xx series Al-Si alloys.

A prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985), see MPEP 2144.05.

Because the prior art of RU'604 combined with "Aluminum Standards and data 2003" teach a modified Al-Si hypereutectic alloy with overlapping (or close approximation) of the presently claimed alloying ranges, it is held that RU'604 combined with "Aluminum Standards and data 2003" have created a prima facie case of obviousness of the presently claimed invention. Overlapping ranges have been held to be a prima facie case of obviousness, see MPEP § 2144.05. It would have been obvious to one of ordinary skill in the art to select any portion of

the range, including the claimed range, from the broader range disclosed in the prior art, because the prior art finds that said composition in the entire disclosed range has a suitable utility.

Concerning claims 5, 15, 35, which mention the “pre-use” Vickers hardness, RU’604 teaches said alloy has excellent strength and hardness (see Table 2, 3). Though RU’604 does not mention the hardness of said alloy, where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a prima facie case of either anticipation or obviousness has been established. In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). Because the prior art teaches a substantially overlapping alloy composition, wherein said alloy is processed in a similar method of casting, the properties applicant discloses and/or claims (such as Vickers hardness) are expected to be present. See MPEP 2112.01.

Concerning claims 6, 19, 30, 36, which mention “wherein size of non-metal inclusion existing within the piston is less than 100  $\mu\text{m}$ ”, because the alloy taught by RU’604 is substantially overlaps the presently claimed alloy composition (as well as being processed by a similar method of casting and heat treating), then substantially the same non-metal inclusions are expected to be present (see discussion above). Additionally, the examiner points out that said claims are not drawn to *all* inclusions, or *an average*, etc., but said limitation is met by one non-metal inclusion being  $\leq 100 \mu\text{m}$ .

Concerning new claims 39-42, which mention the transitional phrase “consists of”, though the prior art of RU’604 teaches the presence of Li, Sn, Cd, and S (on the order of ppm), it would have been obvious to remove these (non-essential) elements along with their function, for the predictable purpose of the loss of said function. Alternatively, because said elements are

present on the order of ppm, said elements are held to be within the level of “impurities” (cl. 39-42, last line), substantially as presently claimed.

Omission of a step or element and its function is obvious if the function of the step or element is not desired or required, MPEP 2144.04, Ex parte Wu, 10 USPQ 2031 (Bd. Pat. App. & Inter. 1989). See also In re Larson, 340 F.2d 965, 144 USPQ 347 (CCPA 1965) (Omission of additional framework and axle which served to increase the cargo carrying capacity of prior art mobile fluid carrying unit would have been obvious if this feature was not desired.); and In re Kuhle, 526 F.2d 553, 188 USPQ 7 (CCPA 1975) (deleting a prior art switch member and thereby eliminating its function was an obvious expedient). Note that the omission of an element and retention of its function is an indicia of unobviousness. In re Edge, 359 F.2d 896, 149 USPQ 556 (CCPA 1966).

#### ***Response to Amendment***

4. In the responses filed on July 17, 2008 and June 27, 2008 applicant submitted various arguments traversing the rejections of record, and a 1.132 declaration.
5. The declaration under 37 CFR 1.132 filed June 27, 2008 is insufficient to overcome the rejection of claims 1,5,6,15,19,26,30,31,35,36 based upon RU'604 and “Aluminum Standards and data 2003” as set forth in the last Office action because: though the examiner agrees that declarations filed June 27, 2008 and November 7, 2007 have shown the Ca is critical in the claimed range of 0.0005-0.003%, and said results occur (for medium Mg embodiment) over the claimed ranges of: Si, Cu, Fe, Mn, Ti, Zr, V, P, and Ca; it is unclear if the unexpected results occur over the entirely claimed alloying ranges of Mg and Ni. For low Mg embodiment, the

examiner agrees declarant has shown the criticality of Ca over the claimed ranges of Si, Ti, and V. however, it is unclear if the unexpected results occur over the entirely claimed alloying ranges of Cu, Ni, Fe, Mn, Zr, P.

The nonobviousness of a broader claimed range can be supported by evidence based on unexpected results from testing a narrower range if one of ordinary skill in the art would be able to determine a trend in the exemplified data which would allow the artisan to reasonably extend the probative value thereof. *In re Kollman*, 595 F.2d 48, 201 USPQ 193 (CCPA 1979).

Said unexpected results are not commensurate in scope with the claimed invention (see MPEP 716.02 d). Whether the unexpected results are the result of unexpectedly improved results or a property not taught by the prior art, the “objective evidence of nonobviousness must be commensurate in scope with the claims which the evidence is offered to support.” In other words, the showing of unexpected results must be reviewed to see if the results occur over the entire claimed range. *In re Clemens*, 622 F.2d 1029, 1036, 206 USPQ 289, 296 (CCPA 1980).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janelle Morillo whose telephone number is (571) 272-1240. The examiner can normally be reached on 7:30 am- 4:00 pm Mon-Wed.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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1793

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**Applicant(s)/Patent under  
Reexamination**

IKUNO ET AL.

**Examiner**

Janelle Morillo

**Art Unit**

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